

**Amended Claims****IAP12 Rec'd PCT/PTO 24 AUG 2006**

1. Method for continuous production of a thermoplastic plate material reinforced with flat fibre structures, in which method a first web-like fibre structure is supplied to a fibre laying device, by means of in-line fibre feed units one or more further web-like fibre structures are arranged over the first fibre structure, by means of one or more matrix feed units connected before or after the fibre feed units a matrix starting material is supplied to exposed layers of fibre structures, and the multilayer fibre web emerging from the fibre laying device and coated one or more times with intermediate layers of matrix starting material is supplied to a continuous press in which the matrix starting material is transformed under the effect of heat and/or pressure into a low viscosity fluid and the multilayer fibre web under impregnation of the fibre structure is pressed into a plate-like plastics material, characterised in that at least one fibre feed unit is formed as a cross layer by means of which a web-like flat structure which is supplied obliquely or diagonally to the advance direction of the fibre web is applied to the fibre web by regular folding thereof along the side edges of the fibre web.
2. Method according to claim 1, characterised in that the web-like surface structure is supplied and folded at an angle of 45° to the advance direction of the fibre web.
3. Method according to claim 1 or 2, characterised in that alternately a web-like fibre structure is supplied unfolded in the advance direction of the fibre web and a subsequent web-like fibre structure is supplied by means of cross layers crossing obliquely or diagonally to the feed direction of the fibre web, where the first and last fibre structures which are supplied are supplied preferably unfolded in the advance direction of the fibre web
4. Method according to any of claims 1 to 3, characterised in that the matrix feed units are in each case arranged after a fibre feed unit with cross layer.

5. Method according to any of claims 1 to 4, characterised in that the matrix starting material is a reactive starting material containing cyclic or macrocyclic oligomers of polyester mixed with a polymerisation catalyst, in particular a reactive starting material containing cyclic oligomers of PBT (CPBT) mixed with a polymerisation catalyst.
6. Method according to one of claims 1 to 5, characterised in that the matrix feed units are powder scatterers by means of which the matrix starting material which is present in powder form is scattered onto a layer of an exposed fibre structure.
7. Method according to any of claims 1 to 6, characterised in that by means of matrix feed supply units a film-like matrix starting material is applied to the exposed surface of a fibre structure.
8. Method according to any of claims 1 to 7, characterised in that the reactive starting material is polymerised in the continuous press into a thermoplastic plastics matrix, in particular into a PBT plastics matrix.
9. Method according to any of claims 1 to 8, characterised in that the fibre laying device contains one or more pressing stations, in particular impression cylinders, by means of which the multilayer fibre web is pre-pressed in-line.
10. Method according to any of claims 1 to 9, characterised in that the pressing station comprises a contact roller and impression roller arranged in pairs, between which the web-like fibre lay is supplied during a pressing process.
11. Method according to claim 10, characterised in that the pressing station is part of a fibre feed unit, where by way of the contact roller a web-like fibre structure is simultaneously supplied, deflected and applied to the fibre web.

12. Method according to any of claims 9 to 11, characterised in that the further fibre structures which are supplied by way of a fibre feed unit in the advance direction of the fibre web are applied by way of a pressing station, in particular by way of a contact roller, onto the multilayer fibre web.
13. Method according to any of claims 1 to 12, characterised in that the multilayer fibre web, after supply of all fibre structures and all matrix starting materials and before entry into the continuous press, is coated on one or both sides with a cover layer in the form of a plastics foil or extruded plastics film, where in the continuous press the cover layer connects to the plastics matrix of the multilayer fibre web.
14. Method according to any of claims 1 to 13, characterised in that the cover layer is made of a thermoplastic plastics, preferably polyester such as PET, in particular a PBT or PBT plastics alloy.
15. Method according to any of claims 1 to 14, characterised in that the multilayer fibre web which is present in the form of a material laminate, in the continuous press under the supply of heat and/or pressure and under polymerisation of the plastics matrix, is connected into a thermoplastic plastics internally and pore-free into a plate-like plastics material.
16. Method according to any of claims 1 to 15, characterised in that the multilayer fibre web is guided through a continuous press with several separately adjustable pressing zones and tempering zones and the contact pressures are generated by floating hydraulically activated lower pressing plates which work against an upper rigid pressing construction.
17. Method according to any of claims 1 to 16, characterised in that the pressure in the continuous press is created by segmented pressure plates with adjustable gap spacing to each other.

18. Method according to any of claims 1 to 17, characterised in that after a particular number of segmented pressing plates, a line pressure is generated to expel pinholes and bubbles from the plastics matrix, in each case by means of an impression cylinder.
19. Method according to any of claims 1 to 18, characterised in that the multilayer fibre web is guided through one or more impression cylinders which are arranged in the continuous press, whereby the multilayer fibre web undergoes a complete bubble-free impregnation of the fibre structure with the melt-like plastics matrix.
20. Device for performance of the method according to claim 1, characterised in that the device contains a fibre laying device and following this in-line a continuous press, and the fibre laying device contains several fibre feed units for in-line supply of web-like fibre structures and one or more matrix feed units connected between or after the fibre feed units for the supply of the matrix starting material onto exposed layers of the fibre structure, characterised in that at least one fibre feed unit is formed as a cross layer, by means of which a web-like fibre structure can be supplied obliquely or diagonally in the advance direction of the multilayer fibre web and folded to form laying edges.
21. Device according to claim 20, characterised in that alternately a fibre feed unit for unfolded supply of a web-like fibre structure in the advance direction of the fibre web and a subsequent fibre feed unit with cross layer for the supply of a web-like fibre structure obliquely or diagonally to the advance direction of the fibre web is present, characterised in that the first and last fibre feed unit is for unfolded supply of a web-like fibre structure in the advance direction of the fibre web.
22. Device according to claim 20 or 21, characterised in that after a fibre feed unit with cross layer is arranged a matrix feed unit.

23. Device according to claim 22, characterised in that the matrix feed unit is a powder scatterer by means of which a matrix starting material which is present in powder form is scattered onto exposed layers of the fibre structure.
24. Device according to claim 22, characterised in that the matrix feed unit is a film feed unit by means of which a film-like matrix starting material is applied to exposed layers of the fibre structure.
25. Device according to any of claims 20 to 24, characterised in that the fibre laying device contains one or more pressing stations, in particular impression cylinders, by means of which the multilayer fibre web is pre-pressed in-line.
26. Device according to any of claims 20 to 25, characterised in that the pressing station comprises a contact roller and an impression roller arranged in pairs and between which the multilayer fibre web is passed under a pressure.
27. Device according to one of claims 20 to 26, characterised in that the pressing station is part of a fibre feed unit and the contact roller serves simultaneously for unfolded feed and deflection of a web-like fibre structure in the advance direction.
28. Device according to any of claims 20 to 27, characterised in that the continuous press contains several separately adjustable pressing zones and tempering zones and the pressing zones, to exert the pressure, contain floating hydraulically activated lower pressing plates which work against an upper rigid pressing construction.

29. Device according to any of claims 20 to 28, characterised in that the pressing zones have segmented pressing plates with adjustable gap spacing to each other.
  30. Device according to any of claims 20 to 29, characterised in that after every particular number of segmented pressing plates is arranged a pressing station, in particular an impression cylinder, to generate a linear pressure.
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